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Misconceptions on the Summation Symbol Subject and Solution Proposals

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Abstract

The aim of the study is to determine the misconceptions of the 11th grade students on the summation symbol subject and to determine the required measures to be taken to prevent these misconceptions and also to analyze other mistakes made other than misconceptions. 11th grade students in private science high school in 2013-2014 academic year form the target population of the study. The questions directed to the students are selected from the university preparation books and magazines of some private courses and publishers.

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Keywords: Summatiion symbol, Misconception ;

1. Introduction

The concepts of math are probably open to misconceptions due to abstract concepts. While learning these concepts if the relational understanding does not come true, the misconceptions and difficulties for learning (Skemp, 1978) may occur. Instead of improving a learning system based on concrete bases and creating an appropriate media, to make the students memorize some formulas causing them non-relating the concepts may result in misconceptions. Meaningful learning happens when learners relate his/her past gatherings to new information and concepts (Ausebel, 1960) and but of course it happens when learners relate the graphs and figures in his/her mind to new information. Based on the strong bases, the new information and concepts may have again a strong fundamentals. There are principles for the effective math learning and reaching the goal. These are given as follows:

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Establishing conceptional bases
The importance of preconditionality
The importance of key concepts
Well determination the duties of students and teachers in learning
Using the environment in learning
Giving a place to researching studies
Improving a positive mood to math (Baykul, 2004)

All the items are completed together, if the insufficiency occurs for one of them it is not possible to reach the success and have positive results for math education.

One of the reasons for students to approach the math lesson with a prefixed idea is it contains abstractions. The difficulties of the perception and the use of these concepts are the main reasons and bases of these prefixed ideas. If the abstract concepts are made concrete using concrete devices these difficulties are handled easily. At the same time the main aim of the math education is to increase the quality of math education and so the problems of learning math can be analyzed well.(Özkan, 2010).

In a wide sense misconception is the misunderstanding of the knowledge directly or wrong commending it indirectly. Misconceptions can be defined as knowledge of preventing to learn scientific truths and also are gained by the person through individual experiences.

Misconceptions are the wrong concepts or conceptions that a person assumes it as true and uses as a habit. Misconceptions have different characteristic properties and differ from random mistakes. The person can realize the mistake and correct it by a little bit warning. But first of all the person who has a specific misconception tends to defend himself/herself when warned (Cankoy, 2000).

As a result of this work it is understood that students have misconceptions on the summation symbol and solved the questions incorrectly due to concentration defects and operation mistakes. In the conclusion part a variety of solutions have been provided to overcome these difficulties experienced by students.

1.1. Learning diffuculties in the subject of summation symbol

Summation symbol, it seems to be easy subject rather than other subjects for students. However, interwievs with students and teachers shows that perception is partially wrong. Investigations show us, students close of their learning system result of not exactly understand problems and operation errors. When continue to doing research, if students solve problems about the subject, they can reduce their errors and they can solve problems.

2. Methodologhy

'What is the problem of 11th grade high school students' in the summation symbol subject of misconception and its errors?' This question constitutes problem of research. The working group of the study is consist of the students that attend any Private Science High School in İstanbul.

As a data collecting tool there are 6 questions to be applied to 11 class students. In this research, 11th grade high school students are investigated, in the summation symbol subject of misconception and problems which is not depend on misconception but it causes some problems in the students. Students make a mistake in their questions. These subjects are focused.

2.1. Findings

Question 1: Find the solution of $\sum_{k=1}^{255} \log_2(\frac{1}{k}+1)$.

In this question, knowledge of students' in the sum symbol and logarithm were measured. In addition to the knowledge of understanding problem and interpretation, processing information were investigated.

Question 2: Find the summation of $\sum_{k=2}^{5} 2^{k-2}$

In this question, knowledge of students' in the concept of information and exponential numbers were measured.

Question 3: $\sum_{x=1}^{75} \ln(\frac{x}{x+1}) = ?$

In this question, knowledge of students' in the concept of information and logarithm desired to be measured.

Question 4: $\sum_{x=1}^{3} \cos\left(\frac{\pi}{6}x\right) = ?$

In this question, students' concept of information and knowledge of trigonometry were investigated.

Questions 5: The roots of $x^2 + (m-1)x + n = 0$ are x_1 and x_2 .If $\sum_{k=1}^{2} x_k = 3$ and $\sum_{k=1}^{2} \frac{1}{x_k} = \frac{3}{7}$ then find $n - m$.

In this question, concept of information and quadratic one unknown type of equations were investigated.

Question 6: $2.3 + 3.4 + 4.5 + ... + 49.50 = ?$

In this question, investigated student's dominance of knowledge of formulas in addition to the concept of information.

4. Conclusion and Recommendings

In this part; towards to obtained data results and their suggestions are presented. All questions are covered by one by.

Results and recommendations for first question: This question, show us generally students understand subject of sum symbol but they have a problem with subject of logarithm. Students should complete their missing parts and they should solve a lot of problems.

Results and recommendations for second question: Generally, this question is solved correctly. By the way, students who solve problems wrongly, they did operation error in their questions. These students can reduce their errors with solving lots of problems.

Results and recommendations for third question: Usually, this question is solved correctly. One student did operation error and find question incorrectly. Also, the other one is find question incorrectly result of lack concept. These students should study their missing subjects and they should solve lots of problems.

Results and recommendations for forth question: Generally, question is solved correctly. Students who make a mistake, they can eliminate their missing part by solving questions. .

Results and recommendations for fifth question: In this question, generally students make a mistake result of misconception. Students should search their missing parts and they should solve lots of problems.

Results and recommendations for sixth question: Most students made mistakes in this question. Generally these mistakes are misconception although some of them connected to operation errors and they cannot reach the results. Students should repeat knowledge of formula and they should solve questions about from data to formula.

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